4. A fan stage of a ducted gas turbine engine that is at least in part rotatable about an axis of rotation, comprising:

a fan casing that defines an inner duct wall having a fan rotor region, the inner duct wall of the fan casing at the fan rotor region being convergent;

a hub disposed concentrically relative to the fan casing;

a fan rotor that includes multiple swept fan blades, the swept fan blades being spaced apart around the hub, each of the multiple swept fan blades having:

a tip profile that substantially corresponds to the convergent inner duct wall of the fan casing;

a leading edge that defines a variable sweep angle in a direction perpendicular to the axis of rotation, the leading edge including:

an inner region adjacent the hub, the inner region defining a forward sweep angle;

an intermediate region between the inner region and the fan casing, the intermediate region defining a rearward sweep angle; and

an outer region between the intermediate region and the fan casing, the outer region being translated forward.

5. A fan stage of a ducted gas turbine engine that is at least in part rotatable about an axis of rotation, comprising:

a fan casing that defines an inner duct wall having a fan rotor region, the inner duct wall of the fan casing at the fan rotor region being convergent;

a hub disposed concentrically relative to the fan casing;

a fan rotor that includes multiple swept fan blades, the swept fan blades being spaced apart around the hub, each of the multiple swept fan blades having:

a tip profile that is convergent so as to substantially correspond to the convergent inner duct wall of the fan casing;

a leading edge that defines a variable sweep angle in a direction perpendicular to the axis of rotation, the leading edge including:

an inner region adjacent the hub, the inner region defining a forward sweep angle;

an intermediate region between the inner region and the fan casing, the intermediate region defining a rearward sweep angle; and

an outer region between the intermediate region and the fan casing, the outer region being translated forward.

6. A fan stage of a ducted gas turbine engine that is at least in part rotatable about an axis of rotation, comprising:

a fan casing that defines an inner duct wall having a fan rotor region, the inner duct wall of the fan casing at the fan rotor region being convergent;

a hub disposed concentrically relative to the fan casing;

a fan rotor that includes multiple swept fan blades, the swept fan blades being spaced apart around the hub, each of the multiple swept fan blades having:

a tip profile that substantially corresponds to the convergent inner duct wall of the fan casing;

a leading edge that defines a variable sweep angle in a direction perpendicular to the axis of rotation, the leading edge including:

an inner region adjacent the hub, the inner region defining a forward sweep angle;

an intermediate region between the inner region and the fan casing, the intermediate region defining a rearward sweep angle; and

an outer region between the intermediate region and the fan casing, the outer region defining a forward sweep angle.

7. A fan stage of a ducted fan gas turbine engine, comprising:

a fan casing having an inner duct wall which in a fan rotor region is convergent in the downstream direction; and

a fan rotor including a multiplicity of swept fan blades spaced apart around a hub mounted concentrically with respect to the fan duct, each of said swept fan blades having (i) a tip profile which in revolution substantially corresponds to the convergent duct wall, (ii) a leading edge of variable sweep angle which varies with increasing blade height or distance from the axis of rotation, said sweep angle having a forward sweep angle in a first height region between the root and a first intermediate radius, a rearward sweep angle in an intermediate height region between the first intermediate radius and a second intermediate radius, and a sweep angle in a third height region between the second intermediate radius and the tip of the blade such that said third height region is translated forward, and (iii) a stagger angle which increases progressively with blade height.

8. A fan stage of a ducted fan gas turbine engine, comprising:

a fan casing having an inner duct wall which in a fan rotor region is convergent in the downstream direction; and

a fan rotor including a multiplicity of swept fan blades spaced apart around a hub mounted concentrically with respect to the fan duct, each of said swept fan blades having (i) a tip profile which in revolution is convergent so as to substantially correspond to the convergent duct wall, (ii) a leading edge of variable sweep angle which varies with increasing blade height or distance from the axis of rotation, said sweep angle having a forward sweep angle in a first height region between the root and a first intermediate radius, a rearward sweep angle in an intermediate height region between the first intermediate radius and a second intermediate radius, and a sweep angle in a third height region between the second intermediate radius and the tip of the blade such that said third height region is translated forward, and (iii) a stagger angle which increases progressively with blade height.

9. A fan stage of a ducted fan gas turbine engine, comprising:

a fan casing having an inner duct wall which in a fan rotor region is convergent in the downstream direction; and

a fan rotor including a multiplicity of swept fan blades spaced apart around a hub mounted concentrically with respect to the fan duct, each of said swept fan blades having (i) a tip profile which in revolution substantially corresponds to the convergent duct wall, (ii) a leading edge of variable sweep angle which varies with increasing blade height or distance from the axis of rotation, said sweep angle having a forward sweep angle in a first height region between the root and a first intermediate radius, a rearward sweep angle in an intermediate height region between the first intermediate radius and a second intermediate radius, and a forward sweep angle in a third height region between the second intermediate radius and the tip of the blade, and (iii) a stagger angle which increases progressively with blade height.

10. A fan stage of a ducted fan gas turbine engine, comprising

a fan casing having an inner duct wall which in a fan rotor region is convergent in the downstream direction; and

a fan rotor including a multiplicity of swept fan blades spaced apart around a hub mounted concentrically with respect to the fan duct, each of said swept fan blades having a tip profile which in revolution is convergent so as to substantially

correspond to the convergent duct wall, a leading edge of variable sweep angle which varies with increasing blade height or distance from the axis of rotation, said sweep angle having a forward sweep angle in a first height region between the root and a first intermediate radius, a rearward sweep angle in an intermediate height region between the first intermediate radius and a second intermediate radius, a forward sweep angle in a third height region between the second intermediate radius and the tip of the blade, a stagger angle which increases progressively with blade height.

11. A fan stage of a ducted fan gas turbine engine as claimed in claim 10 wherein the blade has a tip region of about 24% of blade height characterized in that the stagger angle increases to less than 90° at the tip relative to the airflow direction.

12. A fan stage of a ducted fan gas turbine engine as claimed in claim 11 wherein in a blade tip region of about 24% of the height of the blade the sweep of the leading edge changes from rearward sweep to forward sweep.

13. A fan stage of a ducted fan gas turbine engine as claimed in claim 11 wherein in a blade tip region of about 24% of the height of the blade the sweep of the leading edge decreases.

14. A fan stage of a ducted fan gas turbine engine as claimed in claim 13 wherein the blade is further characterized in that the stagger angle of the mid-height region of the blade is a predetermined fraction of the stagger angle at the tip region.

15. A fan stage of a ducted fan gas turbine engine as claimed in claim 10 wherein the sweep angle of the leading edge of a swept fan blade at a point on the leading edge is less than the complement of the angle of a Mach cone at any other point on the leading edge of the blade at greater radius from the root.

16. A fan stage of a ducted fan gas turbine engine as claimed in claim 10 wherein the shape of the pressure surface of a swept fan blade and the suction surface thereof creates, in use, a line of minimum static pressure points on the suction surface of the blade, said line of minimum static pressure points is inclined with respect to the axial direction at a sweep angle which varies with span height of the blade, and has a negative value in a region of subsonic flow over the leading edge.

17. A fan stage of a ducted fan gas turbine engine as claimed in claim 16 wherein the sweep angle of the line of minimum pressure points at a point on the line is less than the complement of the angle of a Mach cone at any other point on the line.

18. A fan stage of a ducted gas turbine engine that is at least in part rotatable about an axis of rotation and defines a downstream direction along the axis of rotation, comprising:

a fan casing that defines an inner duct wall having a fan rotor region, the inner duct wall of the fan casing at the fan rotor region being convergent;

a hub disposed concentrically relative to the fan casing;

a fan rotor that includes multiple swept fan blades, the swept fan blades being spaced apart around the hub, each of the multiple swept fan blades having:

a tip profile that is convergent so as to substantially correspond to the convergent inner duct wall of the fan casing;

a leading edge that defines a variable sweep angle in a direction perpendicular to the axis of rotation, the leading edge including:

an inner region adjacent the hub, the inner region defining a forward sweep angle;

an intermediate region between the inner region and the fan casing, the intermediate region defining a rearward sweep angle; and

an outer region between the intermediate region and the fan casing, the outer region defining a forward sweep angle.

19. The fan stage according to claim 18, wherein the intermediate region extends further than the inner region along the axis of rotation.

20. The fan stage according to claim 18, wherein the inner duct wall of the fan casing at the fan rotor region is substantially convergent in the downstream direction.

21. The fan stage according to claim 18, wherein the tip profile of the multiple swept fan blades are substantially convergent in the downstream direction.

22. The fan stage according to claim 18, wherein each of the multiple swept fan blades includes a hub contacting surface that extends further than the tip profile along the axis of rotation.

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